

the shortest resistance in fresh water ought to be observed in those Crustacea in which an extremely rapid respiration is combined with a comparatively delicate skin. This fact was, to a great extent, verified: the *Crangones* and *Gammaris* which combine these two conditions are those which live the shortest time in fresh water; the young crabs whose skin is not thick perish more quickly than the hard-skinned individuals. A confirmation of these facts will be found under No. 10.

9. In most cases the presence of chloride of sodium forms one of the indispensable conditions of resistance for the marine Crustacea; but this salt appears to be the only one necessary.

The experiments consisted in the employment of saline solutions of the same compositions as indicated under No. 4.

10. The small individuals and those which have just moulted have the integuments delicate, and present less resistance than the others to the influence of liquids of exceptional composition.

11. The difference between the densities of sea-water and fresh water cannot be regarded as the cause of the death of marine Crustacea in fresh water.

12. (Applicable to both groups.) Endosmose enables us to explain the absorption of salts by the delicate skin or the branchial surfaces of freshwater Articulata when immersed in sea-water. Diffusion and dialysis, taking place with more energy in the case of the chlorides of sodium and magnesium than in that of sulphate of magnesia, show how it is that the chlorides of sea-water are alone absorbed. Lastly, dialysis explains how marine Crustacea, when placed in fresh water, lose the salts with which they are impregnated.

XLVII.—On the supposed Legs of the Trilobite *Asaphus platycephalus*.

To the Editors of the *Annals and Magazine of Natural History*.

DEAR SIRS,

I send you hereby an advance copy of an article of mine\* on a subject which is exciting some interest, thinking that you would wish to publish it in your excellent Journal.

Yours truly,  
JAMES D. DANA.

AT the request of Mr. E. Billings, of Montreal, I have recently examined the specimen of *Asaphus platycephalus* belonging to the Canadian Geological Museum, which has been supposed

\* In 'Silliman's American Journal' for May 1871.

to show remains of legs. Mr. Billings, while he has suspected the organs to be legs so far as to publish on the subject\*, has done so with reserve, saying, in his paper, that "the first and all-important point to be decided is, whether or not the forms exhibited on its underside were truly what they appeared to be, locomotive organs." On account of his doubts, the specimen was submitted by him during the past year to the Geological Society of London; and for the same reason, notwithstanding the corroboration there received, he offered to place the specimen in my hands for examination and report.

Besides giving the specimen an examination myself, I have submitted it also to Mr. A. E. Verrill, Professor of Zoology in Yale College, who is well versed in the invertebrates, and to Mr. S. I. Smith, assistant in the same department, and excellent in crustaceology and entomology. We have separately and together considered the character of the specimen; and while we have reached the same conclusion, we are to be regarded as independent judges. Our opinion has been submitted to Mr. Billings, and by his request it is here published.

The conclusion to which we have come is that the organs are not legs, but the semicalcified arches in the membrane of the ventral surface to which the foliaceous appendages or legs were attached. Just such arches exist in the ventral surface of the abdomen of the *Macrura*, and to them the abdominal appendages are articulated.

This conclusion is sustained by the observation that in one part of the venter three consecutive parallel arches are distinctly connected by the intervening outer membrane of the venter, showing that the arches were plainly *in the membrane* as only a calcified portion of it, and were not members moving free above it. This being the fact, it seems to set at rest the question as to the legs. We would add, however, that there is good reason for believing the supposed legs to have been such arches in their continuing of nearly uniform width almost or quite to the lateral margin of the animal, and in the additional fact that, although curving forward in their course toward the margin, the successive arches are about equidistant or parallel, a regularity of position not to be looked for in free-moving legs. The curve in these arches, although it implies a forward ventral extension on either side of the leg-bearing segments of the body, does not appear to afford any good reason for doubting the above conclusion. It is probable that the two prominences on each arch nearest the median line of the body,

\* Quart. Journ. Geol. Soc. 1870, No. 104, p. 479, with a plate giving a full-sized view of the under surface of the Trilobite, a species that was over 4 inches in length.

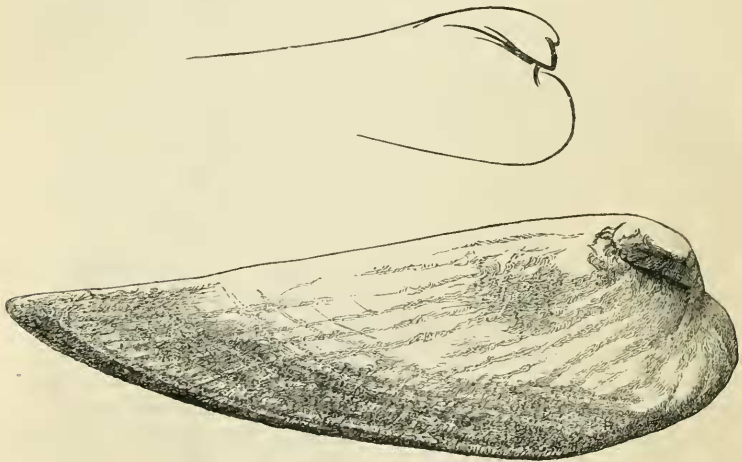
which are rather marked, were points of muscular attachment for the foliaceous appendage it supported.

With the exception of these arches, the under surface of the venter must have been delicately membranous, like that of the abdomen of a lobster or other macruran. Unless the under surface were in the main fleshy, Trilobites could not have rolled into a ball.

XLVIII.—*Notice of a new Australian Ziphioid Whale.* By G. KREFFT, F.L.S.; with a Note by Dr. J. E. Gray, F.R.S.

I ENCLOSE the photograph of the tooth of a new whale, 18 feet long, caught in Little Bay. It is allied to the genus *Mesoplodon*, and I propose to call it *Mesoplodon Güntheri*. We have the entire skeleton. The tooth was imbedded in the mandible, and is bent, the tip towards the margin; but it was not visible from without. Unfortunately, the body was very much hacked and lacerated; but most of the abdominal viscera have been saved.

Sydney, Feb. 24, 1871.



The form of the tooth is so unlike that of any other Ziphioid known, that I regard it as indicating a new genus, which I would propose to call *Callidon*, characterized by the form and surface. It is here figured from Dr. Krefft's photograph and sketch.—J. E. G.